UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,434	09/28/2001	Daniel F. Casper	POU920010154US1	6357

			EXAMINER
7590	09/30/2004		KNOLL, CLIFFORD H

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ART UNIT	PAPER NUMBER
2112	

DATE MAILED: 09/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	**Applicant(s)**
Office Action Summary	09/966,434	CASPER ET AL.
	Examiner	**Art Unit**	
	Clifford H Knoll	2112	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE **3** MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2004*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5-9,11,13-17,19,21-25,27 and 29-32* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3, 5-9, 11, 13-17, 19, 21-25, 27, 29-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

This Office Action is responsive to communication filed 6/25/2004. Currently claims 1, 3, 5-9, 11, 13-17, 19, 21-25, 27, and 29-32 are pending. Claims 2, 4, 10, 12, 18, 20, 26, and 28 have been cancelled.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

Claims 1, 3, 5-7, 9, 11, 13-15, 17,19, 21-23, 25, 27, and 29-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Bakke (US 6704812).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1, 9, 17, and 25, Bakke discloses a main memory for storing data and one or more I/O devices for receiving data from or sending data to the main memory (e.g., col. 2, line 67 – col. 3, line 4, col. 4, lines 30-33), control unit and I/O processor (e.g., col. 3, lines 29-31 establishes control), disparate channels between said IOP and said control unit, each channel including multiple channel paths (e.g., col.

3, lines 4-5), a computer program executed by said IOP for assigning a path weight to

certain channel paths whereby the next channel path to carry data between the main

memory and I/O devices is selected (e.g., col. 3, lines 8-10, "each received command,

selecting one..."), disparate channels include more than one type of channel (e.g.,

Abstract, "...need not have the same protocol"), and an algorithm for assigning a path

weight to a channel path candidate dependent on the type of channel (e.g., col. 4, lines

11-12).

Regarding claims 3, 11, 19, and 27, Bakke also discloses one or more channel

types (e.g., col. 1, lines 50-55).

Regarding claims 5, 13, 21, and 29, Bakke also discloses selecting by round

robin (e.g., col. 4, lines 57-59).

Regarding claims 6, 14, 22, and 30, Bakke also discloses channel busy data

stored by each channel and a copy by the IOP and using the data in the busy data for

assigning a weight (e.g., col. 4, lines 2-3).

Regarding claims 7, 15, 23, and 31, Bakke also discloses the classes of great

candidate (e.g., col. 11, lines 55-58), bad candidate (e.g., col. 13, lines 31-34), or an OK

candidate and selecting the OK candidate with the least path weight if there are not

great candidates found (e.g., col. 11, lines 64-67).

Regarding claim 8, 16, 24, and 32, Bakke also discloses multiple IOPs each

channel having an affinity to one IOP (e.g., col. 7, lines 36-40), a work queue having

work elements for each IOP (e.g., col. 7, line 26), a loop for determining the best class

of available candidates (e.g., col. 11, line 64 – col. 12, line 6) and from that class picking

the candidate that has affinity to the IOP with the least number of work elements in its

work queue (e.g., col. 4, lines 3-6).

Claims 1, 3, 5-9, 11, 13-17, 19, 21-25, 27, and 29-32 are rejected under 35

U.S.C. 102(e) as being anticipated by Blumenau (US 6574667).

Regarding claims 1, 9, 17, and 25, Blumenau discloses a main memory for

storing data and one or more I/O devices for receiving data from or sending data to the

main memory (e.g., col. 4, lines 13-15), control unit and I/O processor (e.g., col. 4, lines

27-29 establishes control), disparate channels between said IOP and said control unit,

each channel including multiple channel paths (e.g., col. 5, lines 4-7), a computer

program executed by said IOP for assigning a path weight to certain channel paths

whereby the next channel path to carry data between the main memory and I/O devices

is selected (e.g., col. 6, lines 35-38), disparate channels include more than one type of

channel (e.g., col. 5, lines 28-31), and an algorithm for assigning a path weight to a

channel path candidate dependent on the type of channel (e.g., col. 16, lines 60-63).

Regarding claims 3, 11, 19, and 27, Blumenau also discloses one or more

channel types (e.g., col. 5, lines 28-31).

Regarding claims 5, 13, 21, and 29, Blumenau also discloses selecting by round

robin (e.g., col. 6, lines 35-38).

Regarding claims 6, 14, 22, and 30, Blumenau also discloses channel busy data

stored by each channel and a copy by the IOP and using the data in the busy data for

assigning a weight (e.g., col. 5, lines 54-57).

Regarding claims 7, 15, 23, and 31, Blumenau also discloses the classes of

great candidate (e.g., col. 16, lines 60-63), bad candidate (e.g., col. 5, lines 54-57), or

an OK candidate and selecting the OK candidate with the least path weight if there are

no great candidates found (e.g., col. 5, lines 58-63).

Response to Arguments

Applicant's arguments filed 6/25/2004 have been fully considered but they are

not persuasive.

Regarding claims 1, 9, 17, and 25, Applicant argues that the claimed invention

"assigns a path weight on a per path basis for the same I/O request where each path

may have an entirely different set of criteria or formula to determine the path weight that

is comparable against other path weights for other different kinds of paths connected to

the same target device" and in contrast characterizes Bakke as disclosing "a common

formula used for every path" (p. 8); however, at the cited passage, it is seen that Bakke

discloses a broad variety of load balancing factors, which the Examiner deems to

anticipate the claim language.   The feature at issue in claim 1 is "assigning a path

weight to a channel path candidate dependent upon the type of channel containing the

channel path candidate" and "disparate channels including more than one type of

channel". However, Bakke discloses the calculation of factors and it is deemed by the

Examiner that any difference in the result among channels is indicative of a disparate

channel and further indicative of a different type of channel. In this interpretation, if

there was only "one type" of channel in Bakke, then the calculated factors would all be

the same, which is clearly not the case. Different factors lead to different sums, which

lead to the preference of one channel over the other, which ipso facto requires different

channel types. Interpreting the claimed recitation as broadly as reasonable, the

Examiner finds that "more than one type of channel" admits no distinction from this

interpretation.

Regarding claim 6, Applicant argues that Bakke does not disclose storing

channel busy data and "using the data in said CBDs for assigning a path weight" and

suggests that "load balancing [in Bakke] is performed dynamically and on a per

command basis [which] seems to indicate that no such storage is occurring" (p. 9).

However, the Examiner has cited Bakke: "another load balancing factor may be the

number of outstanding commands on a physical path" (col. 4, lines 2-3). The

"outstanding commands" imply storage, while their "outstanding" nature implies a busy

channel. This is interpreted as channel busy data and it is seen to be used in assigning

a path weight. The recitation provides no distinction from this interpretation.

Thus the rejection of claims 1, 3, 5-7, 9, 11, 13-15, 17,19, 21-23, 25, 27, 29-31

using Bakke is maintained.

Regarding claim 8, Applicant argues that Bakke "does not consider paths connected to multiple 'redundancy managers' in multiple adapters for a given command; instead, Bakke only considers paths 222, 232 directly connected to a particular 'redundancy manager' 350 in a single adapter 140 for a single command" (p. 9). Examiner agrees that a distinction exists; in particular, claim 8 recites, "picking a candidate that has affinity to the IOP with the least number of work elements on its work queue". This recitation requires a selection among multiple IOPs for the IOP with the least number of work elements. This selection is not disclosed by Bakke. Therefore, Examiner has withdrawn the rejection using Bakke of claims 8, 16, 24, and 32.

Regarding claims 1, 9, 17, and 25, Applicant argues that Blumenau fails to disclose "assigning a path weight to selected ones of said channel paths whereby the next channel path to carry data between said main memory and said I/O devices is selected" because Blumenau "does not assign any path weights" (p. 10). Applicant notes the cited passage states selecting "a storage port from the list in a round-robin fashion"; however, at least this disclosure is an assignment of path weights. A round-robin fashion weights the path selection against the most recently used path and is deemed anticipatory.

Applicant further argues that Blumenau fails to disclose "assigning a path weight to a channel path candidate dependent on the type of channel containing the channel path candidate"; however, as discussed supra *any* operational distinction among of paths (in particular loading characteristics) renders the paths of different type.

Blumenau discloses: "the dynamic balancing facility adjusts the list of storage

subsystem ports for each loop port based on the frequency of data packets received

from and transmitted to each of the loop ports and a priority level assigned to each of

the loops, in order to dynamically balance the loading of the data packets upon the

storage ports" (col. 6, lines 47-53) and is deemed anticipatory.

Regarding claim 6, Applicant argues that Blumenau stores a "storage access

request and not the 'busy response'"; however, no distinctive feature of the claimed

busy data is recited. The "storage access request" of Blumenau is stored because of

busy conditions and is properly considered the response to a busy condition because

otherwise, Blumenau does not store it in the same fashion.

Regarding claim 8, Applicant attempts to distinguish from Blumenau by arguing

that the claimed invention allows any channel having connectivity to I/O devices to be

eligible for path selection regardless of which IOP ('host') is requesting an I/O operation.

Thus, if there is a concentration of many I/O requests from one IOP ('host'), the

requests can be interspersed to the I/O devices among all of the paths rather than, as

Blumenau discloses, restricting the path selection to a subset of them until the routing

table gets refreshed with a set of new paths" (p. 12); however this distinction is not

supported by the claims. As cited, Blumenau discloses an affinity, and Blumenau

discloses "picking that candidate with an affinity to the IOP with the least number of

work elements on its work queue". The "restriction" as disclosed by Blumenau, and

argued by the Applicant supra as a distinct aspect of Blumenau's "affinity" feature does

not find support in the recitation to distinguish.

Thus the rejection of the pending claims using Blumenau is maintained.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Clifford H Knoll whose telephone number is 703-305-

8656. The examiner can normally be reached on M-F 0630-1500.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mark H Rinehart can be reached on 703-305-4815. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

chk

Khanh Dang
Primary Examiner